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Comparative study of the effect of sample matrix on the atomic absorption of high-volatile elements in two-step and conventional atomizers

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Abstract

The space-time dynamics of absorbing atomic layers of cadmium and lead and molecular layers of zinc chloride in a commercially produced transverse-heated graphite atomizer and a newly developed two-step atomizer was studied. It was shown that the limiting temperature of cadmium pyrolysis in the two-step atomizer without the use of modifiers may be as high as 1000°C, whereas in the commercial analyzer is it not higher than 300°C. Levels of nonselective absorption due to sodium chloride were compared. It was found that, for a two-step atomizer, the maximum allowable mass of sodium chloride for which the background at lead and cadmium lines can be adequately compensated is 17-30 times higher than that for the commercial atomizer. The atomization of cadmium in the presence of sodium chloride was studied using time, space, and spectral resolution. It was shown that the effect of the chloride matrix in the two-step atomizer is suppressed because of sample fractionation and distillation in the course of its evaporation and condensation.

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